

STATUS UPDATE OF SUGAR/NICOTINE BALANCE TECHNOLOGY ASSESSMENT

STATUS:

- Work by Gary Shelar has demonstrated that casing burley tobaccos with fructose, glucose or sucrose significantly reduces smoke pH and volatile nicotine of straight grade burley cigarettes.
- Analysis of the relationship of smoke pH and volatile nicotine versus added sugar indicates that most of the reduction of pH and volatile nicotine is obtained when the ratio of sugar to nicotine in the cased burley strip reaches approximately 3.3 to 1. Addition of sugars beyond the 3.3 to 1 sugar/nicotine ratio yield diminishing returns in terms of lowering pH and volatile nicotine.
- Informal sensory evaluation by several "expert smokers" of straight burley tobaccos with various sugar nicotine ratios indicates that the best overall smoking quality is obtained at sugar nicotine ratios of approximately 3.3 to 1. Burleys with sugar/nicotine ratios significantly lower than 3.3 to 1 tend to be very harsh and "grabbing" in the throat, while those with ratios significantly higher than 3.3 to 1 are excessively stinging in the nose. Significant "off taste" resulted when glucose was used as the only sugar for burley casing.
- Learning from sugar/nicotine work, along with other information was incorporated into a new casing that has been successfully tested on prototypes for both CAMEL RU and WINSTON SB Lts. This casing has no licorice, higher cocoa and high fructose corn syrup at application rates to yield at least a 3.5 to 1 sugar nicotine ratio.
- It should be noted that most of the work completed to date has dealt only with burley tobacco. Extrapolation of this work to other blend components or even to blended cigarettes can not yet be supported by sound data.

UNANSWERED QUESTIONS:

- What is the effect of high temperature drying (burley heat treatment) on pH, volatile nicotine and smoking quality of burley tobacco cased with HFCS or Sucrose. That is, are the benefits of "balancing the sugar and nicotine" on the burley significantly affected by the sugar reactions that occur during heat treatment?
- Does the sugar/nicotine balance concept apply to other tobaccos? That is, are there optimum sugar/nicotine ratios for flue cured and turkish tobaccos, and if so, what are they?
- Does blending high and low sugar/nicotine ratio tobaccos to average target achieve the same result as balancing each of the individual components by addition or removal of sugar prior to blending?
- Can high sugar, low nicotine (i.e. high sugar/nicotine ratio) tobaccos be improved through ammoniation.

NEXT STEPS:

- **HFCS-vs-Sucrose and Heat Treatment:** PD-4899 (K. W. Smith), made 8/18/89, will evaluate chemical and sensory properties of burley tobacco and blended cigarettes made with either HFCS or Sucrose in two different casing formulas with and without heat treatment.
- **Gary Shelar** has begun initial experimentation on addition of sugars to flue cured tobaccos that are high in nicotine and low in sugar. Work will continue through year end.
- **In September, Neil McClanahan** in conjunction with Brand Development Technology Assessment personnel will begin ammoniation experiments on lower stalk (high sugar, low nicotine) flue cured tobacco. Initial experiments will characterize chemical and sensory effects of various processing conditions (Time, Temperature and Ammonia). After completing flue cured experiments, we will then look at ammoniation of turkish tobaccos in 1993.
- **During 3rd Qtr. 92** we will design test to evaluate blending approaches versus balancing of individual blend components. Burley tobacco will be evaluated first and result should be available by end of year. During 1st Qtr. 93, learning from burley experimentation, ammoniation of flue cured tobacco, and Gary Shelar's work on flue cured will be used to design and conduct experiments on balancing flue cured tobaccos.